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Deep Learning in Content-Based Recommender Systems

Overview

If you have ever used the internet to buy a product or watch a video, you have probably used a recommender system. Recommender systems use data to predict a user's opinion on an item. They are used on websites like Amazon or Netflix to recommend new items to a user. Recommender systems are an extremely valuable asset for any web-based business. Many recommender systems work using what is called content-based filtering. Content-based filtering makes recommendations and predictions using a description of the item (usually a list of keywords or attributes) and a profile of the user's preferences.

Over the past several years, recommender systems have become more and more popular for various businesses. Recently, not just in the realm of recommender systems, but throughout the tech world, deep learning and deep neural networks have become more and more popular. In the past couple of years, there have been some recommender systems written using deep neural networks. However, the application of deep learning in recommender systems is still a relatively young idea with much to be explored. For my thesis, I am interested in the performance of content-based recommender systems that use deep learning to create user models, particularly in comparison to systems that use more traditional methods of user-modeling. To study this performance, I will write recommender systems that create user models in more common ways: the Naive Bayes Method, decision trees, and shallow neural networks. I will write these systems

What are some of the examples?

What's a shallow neural network? Any difference to the general neural network we might be familiar with as a general cs major?

in Python with the help of **scikit-learn**, a library for machine learning. I also plan to write a content-based recommender system that uses deep learning to create user models. I will write Specifically, what part of deep learning are you planning to use? Are you focusing on shallow neural networks or you are also interested in some other models this particular system using **conx**, a Python library for deep learning and neural networks, which is built on top of **Keras**, another Python library for deep learning.

Once I have written programs for these systems, I will perform a comparative analysis between them using large datasets. I will evaluate each recommender system based on two factors: NDCG (Normalized Discounted Cumulative Gain) and run-time. In my paper I plan to Could you explain the NDCG metric in more detail? This isn't as common as Naive Bayes, Decision Tree, and Deep Learning to a general CS major. talk in-depth about these results and the advantages and disadvantages of each type of recommender-system.

Advising

Professor Doug Blank, who specializes in research in deep-learning and is a main collaborator on the conx library, has agreed to advise me on this project.